

WE CLAIM:

1. An adapter for mounting any one of a blowout preventer, a high pressure valve, and a well stimulation tool to a double-locking casing mandrel of an independent screwed wellhead, the adapter comprising:

an adapter pin comprising a hollow cylindrical body having a central passage, a top nipple section with a top pin thread, and a bottom nipple section with a bottom pin thread; and

one of:

a lockdown flange comprising a top end to which the blowout preventer, the high pressure valve, or the well stimulation tool can be mounted; an axial passage having a box-threaded bottom end for receiving the top nipple section of the adapter pin and threadedly engaging the top pin thread thereof; and a lockdown nut supported by an annular shoulder below the top end, the lockdown nut having a box thread for engaging a pin thread on the outer wall of a top end of the double-locking casing mandrel; and

a retainer flange for providing a mounting surface to which the any one of the blowout preventer, high pressure valve, and well stimulation tool can be mounted, the retainer flange comprising an annular flange with an axial passageway that is box-threaded for engaging a pin thread on a top end of the casing mandrel.

2. An adapter for mounting any one of a blowout preventer, a high pressure valve, and a well stimulation tool to a double-locking casing mandrel of an independent screwed wellhead, the adapter comprising:

an adapter pin comprising a hollow cylindrical body having a central passage, a top nipple section with a pin-threaded top end for connection to the blowout preventer, the high pressure valve, or the well stimulation tool, and a bottom nipple section with a pin-threaded bottom end for connection to a top box thread in a central passage of the double-locking casing mandrel; and

a retainer flange comprising an annular flange having a top surface to which the any one of the blowout preventer, the high pressure valve, and the well stimulation tool can be mounted, and a box-threaded axial passage for engaging a pin thread on an outer wall of a top end of the casing mandrel.
3. The adapter as claimed in claim 2 wherein the top nipple section of the adapter pin comprises a sealing nipple located between the top and bottom pin threads on the adapter pin.
4. The adapter as claimed in claim 3 wherein the sealing nipple comprises a smooth, cylindrical outer surface that mates with O-rings retained in grooves in a central passage through the one of the blowout preventer, the high pressure valve and the well stimulation tool.

5. The adapter as claimed in claim 2 wherein the bottom nipple section of the adapter pin comprises a sealing nipple located between the top and bottom pin threads on the adapter pin.
6. The adapter as claimed in claim 5 wherein the sealing nipple comprises a smooth, cylindrical outer surface that mates with O-rings retained in grooves in a central passage through the casing mandrel.
7. An adapter for mounting any one of a blowout preventer, a high pressure valve, and a well stimulation tool to a double-locking casing mandrel of an independent screwed wellhead, the adapter comprising:
 - an adapter pin comprising a hollow cylindrical body having a central passage, a top nipple section with a pin-threaded top end for connection to the blowout preventer, the high pressure valve, or the well stimulation tool, and a bottom nipple section with a pin-threaded bottom end for connection to a top box thread in a central passage of the double-locking casing mandrel; and
 - a lockdown flange having a top end to which any one of the blowout preventer, the high pressure valve, and the well stimulation tool can be mounted; an axial passage having a box-threaded bottom end for receiving the top nipple section and threadedly engaging the top pin thread of the adapter pin; and a lockdown nut rotatably supported by an annular shoulder located above the bottom end, the lockdown nut having a box

thread for engaging an external pin thread on an outer wall of a top end of the double-locking casing mandrel.

8. The adapter as claimed in claim 7 wherein the box-threaded bottom end of the axial passage of the lockdown flange further comprises:

an annular seal retainer for retaining an elastomeric seal that seals against a smooth cylindrical wall of a sealing nipple on a top end of the adapter pin; and

a bottom box thread for engaging the top pin thread on the top nipple section of the adapter pin.
9. The adapter as claimed in claim 8 wherein the bottom nipple section of the adapter pin comprises a sealing nipple located above the bottom pin threads on the adapter pin.
10. The adapter as claimed in claim 9 wherein the sealing nipple comprises a smooth, cylindrical outer surface that seals against O-rings retained in grooves in a secondary seal bore of the casing mandrel.
11. An adapter for connecting to a casing mandrel of an independent screwed wellhead, the casing mandrel having a secondary seal bore of greater diameter than a top end box thread of the casing mandrel, a pin thread on a top outer wall, and an annular groove on a top lip between the secondary seal bore and the top outer wall; the adapter comprising:

a retainer flange having threaded bores spaced circumferentially about a box-threaded axial passage for securing any one of a blowout preventer, a high pressure valve, and a well stimulation tool to the retainer flange, wherein the box-threaded axial passage is adapted to engage the pin thread on the outer wall, and is of a diameter equal to the diameter of the top outer wall of the casing mandrel.

12. A method for stimulating a well equipped with a double-locking casing mandrel of an independent screwed wellhead, comprising:

sealingly connecting to the casing mandrel an adapter pin that comprises a hollow cylindrical body with an internal diameter at least as large as that of a casing supported by the casing mandrel, by thread-engaging rotation of a pin-threaded nipple section of the adapter pin with respect to a top end box thread of the casing mandrel;

threadedly connecting a retainer flange to a pin thread on an outer wall of a top end of the casing mandrel;

securing well stimulation equipment to the casing mandrel using a pin-treaded top end of the adapter pin, and box threaded bores in a top surface of the retainer flange for receiving flange bolts; and

stimulating the well by pumping high pressure well stimulation fluids through the well stimulation equipment into the casing of the well.

13. The method as claimed in claim 12 wherein the step of securing comprises rotating any one of a well stimulation tool, a blowout preventer, and a high pressure valve into connection with the pin-threaded top end, and then bolting the one of the well stimulation tool, blowout preventer, and high pressure valve to the top surface of the retainer flange.
14. The method as claimed in claim 12 wherein the step of securing comprises mounting a blowout preventer to the retainer flange, mounting a blowout preventer protector to the blowout preventer, and stroking the blowout preventer protector through the blowout preventer and into a secondary seal bore of the casing mandrel prior to stimulating the well.
15. The method as claimed in claim 12 wherein the step of securing comprises mounting a high pressure valve above the blowout preventer.
16. The method as claimed in claim 15 further comprising connecting high pressure fracturing lines to the high pressure valve to permit the high pressure well stimulation fluids to be pumped into the casing of the well.
17. A method for stimulating a well equipped with a double-locking casing mandrel of an independent screwed wellhead, comprising:

sealingly connecting both the casing mandrel, and a lockdown flange to an adapter pin that has an

- internal diameter at least as large as a casing connected to a bottom end of the casing mandrel;
- threadedly connecting a lockdown nut of the lockdown flange supported by an annular shoulder below a top end of the lockdown flange, to a pin thread on an outer wall of a top end of the casing mandrel;
- mounting well stimulation equipment to a top surface of the lockdown flange; and
- stimulating the well by pumping high pressure well stimulation fluids through the well stimulation equipment and into the casing of the well.
18. The method as claimed in claim 17 wherein mounting the well stimulation equipment comprises mounting any one of a well stimulation tool, a blowout preventer, and a high pressure valve in a sealed connection to the lockdown flange.
 19. The method as claimed in claim 18 wherein mounting the well stimulation equipment comprises mounting the blowout preventer, and further comprises mounting a blowout preventer protector and stroking the blowout preventer protector through the blowout preventer, and packing off the blowout preventer protector against a secondary seal bore of the casing mandrel.
 20. The method as claimed in claim 18 wherein mounting the well stimulation equipment comprises mounting the blowout preventer, and further comprises mounting a high pressure valve above the blowout preventer.

21. The method as claimed in claim 17 wherein one of a well stimulation tool and a high pressure valve is mounted above the retainer flange and mounting the well stimulation equipment further comprises:
mounting a high pressure valve to the one of the well stimulation tool and the blowout preventer; and
connecting high pressure fracturing lines to the high pressure valve to permit the well stimulation fluids to be pumped into the casing of the well.
22. A method for stimulating a well equipped with a double-locking casing mandrel of an independent screwed wellhead, comprising:
threadedly connecting a retainer flange to a pin thread on an outer wall of a top end of the casing mandrel;
mounting well stimulation equipment having an internal diameter at least as large as that of the casing mandrel, to the top of the retainer flange in sealed connection with a top of the casing mandrel; and
completing the well by pumping high pressure well stimulation fluids through the well stimulation equipment into the casing of the well.
23. The method as claimed in claim 22 wherein mounting the well stimulation equipment comprises mounting at least one of a well stimulation tool, a blowout preventer (BOP), and a high pressure valve in sealed connection with the top of the casing mandrel.

24. The method as claimed in claim 22 wherein mounting the well stimulation equipment comprises mounting a blowout preventer to the retainer flange, and mounting a BOP protector to the blowout preventer and stroking the BOP protector through the blowout preventer, and packing off the BOP protector against a secondary seal bore of the casing mandrel.
25. The method as claimed in claim 24 wherein mounting the well stimulation equipment further comprises mounting a high pressure valve to a top of the blowout preventer protector.
26. The method as claimed in claim 22 wherein mounting the well stimulation equipment further comprises:
mounting a high pressure valve to the retainer flange; and
connecting high pressure fracturing lines to the high pressure valve to permit the well stimulation fluids to be pumped into the casing of the well.